International Ocean Discovery Program
Expedition 391 Scientific Prospectus Addendum

Walvis Ridge Hotspot: drilling Walvis Ridge, Southeast Atlantic Ocean, to test models of ridge-hotspot interaction, isotopic zonation, and the hotspot reference frame

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This IODP *Scientific Prospectus* is based on precruise *JOIDES Resolution* Facility advisory panel discussions and scientific input from the designated Co-Chief Scientists on behalf of the drilling proponents. During the course of the cruise, actual site operations may indicate to the Co-Chief Scientists, the Expedition Project Manager/Staff Scientist, and the Operations Superintendent that it would be scientifically or operationally advantageous to amend the plan detailed in this prospectus. It should be understood that any substantial changes to the science deliverables outlined in the plan presented here are contingent upon the approval of the IODP JRSO Director and/or *JOIDES Resolution* Facility Board.

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Introduction

This addendum to the International Ocean Discovery Program Expedition 391 *Scientific Prospectus* (Walvis Ridge Hotspot; Sager et al., 2020) incorporates minor coordinate changes to Proposed Sites CT-5A, CT-6A, TT-3A, TT-4A, TT-5A, VB-7A, VB-8A, VB-10A, VB-11A, VB-13A, and VB-14A. The revised site coordinates are documented in Proposal 890-Add2, which is available at **http://iodp.tamu.edu/scienceops/expeditions/walvis_ridge_hotspot.html**.

In addition, because of adjustments to the R/V *JOIDES Resolution* operations schedule caused by the COVID-19 pandemic, the expedition was postponed by a year. At the time of publication of this addendum, the expedition is scheduled to start in Cape Town, South Africa, on 6 December 2021 and end in Cape Town, South Africa, on 5 February 2022.

For a detailed description of the geologic background, scientific objectives, drilling and coring strategy, logging strategy, sample and data sharing strategy, and proposed sites, see Tables **T1** and **T2** in this report and the Expedition 391 *Scientific Prospectus* (Sager et al., 2020).

Reference

Sager, W., Hoernle, K., and Petronotis, K., 2020. *Expedition 391 Scientific Prospectus: Walvis Ridge Hotspot*. International Ocean Discovery Program. **https://doi.org/10.14379/iodp.sp.391.2020**

Table T1. Operations plan and time estimates for primary sites, Expedition 391. EPSP = Environmental Protection and Safety Panel, RCB = rotary core barrel, FMS = Formation MicroScanner, FFF = free-fall funnel.

Proposed site	Location (latitude, longitude)	Seafloor depth (mbrf)	Description of operations	Transit (days)	Coring, drilling (days)	Logging (days)
Cape Town			Begin Expedition 5.0	port call days		
			Transit ~784 nmi to VB-12A at 10.5 knots	3.1		
VB-12A	25.433078° S	3667	Hole A: RCB core to 393 mbsf; Log with triple combo & FMS-sonic	0	5.1	1.0
EPSP approval	6.956190° E		(sediment thickness: 293 m, basement penetration: 100 m)			
to 650 mbsf						
			Subtotal days on site: 6.1			
			Transit ~215 nmi to FR-1B at 10.5 knots	0.9		
FR-1B	21.866100° S	3259	Hole A: Deploy FFF; RCB core to 421 mbsf; Log with triple combo & FMS-sonic	0	9.8	1.0
EPSP approval	6.590600° E		(sediment thickness: 171 m, basement penetration: 250 m)			
to 521 mbsf						
			Subtotal days on site: 10.9			
			Transit ~183 nmi to VB-14A at 10.5 knots	0.7		
VB-14A	24.595881° S	3046	Hole A: RCB core to 410 mbsf; Log with triple combo & FMS-sonic	0	4.7	1.0
EPSP approval	5.121919° E		(sediment thickness: 310 m, basement penetration: 100 m)			
to 650 mbsf						
			Subtotal days on site: 5.7			
			Transit ~395 nmi to TT-04A at 10.5 knots	1.6		
TT-4A	30.166925° S	3465	Hole A: RCB core to 252 mbsf; Log with triple combo & FMS-sonic	0	4.4	0.9
EPSP approval	1.177510° E		(sediment thickness: 152 m, basement penetration: 100 m)			
to 550 mbsf						
			Subtotal days on site: 5.3			
			Transit ~149 nmi to CT-04A at 10.5 knots	0.6		
CT-4A	32.131000° S	4436	Hole A: Deploy FFF; RCB core to 528 mbsf; Log with triple combo & FMS-sonic	0	11.2	1.2
EPSP approval	0.592700° W		(sediment thickness: 278 m, basement penetration: 250 m)			
to 650 mbsf						
			Subtotal days on site: 12.4			
			Transit ~182 nmi to GT-04A at 10.5 knots	0.7		
GT-4A	31.344400° S	2370	Hole A: RCB core to 402 mbsf; Log with triple combo & FMS-sonic	0	4.9	1.0
EPSP approval	2.847000° E		(sediment thickness: 302 m, basement penetration: 100 m)			
to 652 mbsf						
			Subtotal days on site: 5.9			
			Transit ~803 nmi to Cape Town at 10.5 knots	3.2		
Cape Town			End Expedition	10.7	40.1	6.1

Port call days:	5.0	Total operating days:	57.0
Total days on site:	46.2	Total expedition days:	62.0

Table T2. Time estimates for alternate sites, Expedition 391. EPSP = Environmental Protection and Safety Panel, FFF = free-fall funnel, RCB = rotary core barrel, FMS = Formation MicroScanner. (Continued on next two pages.)

Proposed site	Location (latitude, longitude)	Seafloor depth (mbrf)	Description of operations	Coring, drilling (days)	Logging (days)
CT-1B	32.491200° S	1945	Hole A: Deploy FFF; RCB core to 577 mbsf; Log with triple combo & FMS-sonic	8.8	1.1
EPSP approval	0.141900° W		(sediment thickness: 327 m, basement penetration: 250 m)		
to 613 mbsf					
			Subtotal days on site: 9.9		
CT-5A	32.328059° S	3806	Hole A: Deploy FFF; RCB core to 417 mbsf; Log with triple combo & FMS-sonic	9.6	1
EPSP approval	0.643115° W		(sediment thickness: 167 m, basement penetration: 250 m)		
to 550 mbsf					
			Subtotal days on site: 10.6		
CT-6A	32.418908° S	2768	Hole A: Deploy FFF; RCB core to 447 mbsf; Log with triple combo & FMS-sonic	8.9	1
EPSP approval	0.579560° W		(sediment thickness: 197 m, basement penetration: 250 m)		
to 550 mbsf					
			Subtotal days on site: 9.9		
FR-2B	21.707300° S	3019	Hole A: Deploy FFF; RCB core to 693 mbsf; Log with triple combo & FMS-sonic	11.4	1.2
EPSP approval	6.762000° E		(sediment thickness: 443 m, basement penetration: 250 m)		
to 812 mbsf					
			Subtotal days on site: 12.6		
GT-5A	31.467100° S	4901	Hole A: RCB core to 362 mbsf; Log with triple combo & FMS-sonic	5.5	1.1
EPSP approval	3.072000° E		(sediment thickness: 262 m, basement penetration: 100 m)		
to 612 mbsf					
			Subtotal days on site: 6.6		
TT-1A	30.380800° S	1875	Hole A: RCB core to 272 mbsf; Log with triple combo & FMS-sonic	3.7	0.8
EPSP approval	1.089400° E		(sediment thickness: 162 m, basement penetration: 100 m)		
to 498 mbsf					
			Subtotal days on site: 4.5		
TT-2A	30.246700° S	2367	Hole A: RCB core to 489 mbsf; Log with triple combo & FMS-sonic	5.1	1.1
EPSP approval	0.839200° E		(sediment thickness: 389 m, basement penetration: 100 m)		
to 739 mbsf					
			Subtotal days on site: 6.2		
TT-3A	30.368460° S	1882	Hole A: RCB core to 235 mbsf; Log with triple combo & FMS-sonic	3.6	0.8
EPSP approval	1.085519° E		(sediment thickness: 135 m, basement penetration: 100 m)		
to 550 mbsf					
			Subtotal days on site: 4.4		
TT-5A	30.606835° S	2843	Hole A: RCB core to 244 mbsf; Log with triple combo & FMS-sonic	4.0	0.9
EPSP approval	0.976147° E		(sediment thickness: 144 m, basement penetration: 100 m)		
to 550 mbsf					
			Subtotal days on site: 4.9		
VB-1B	23.417600° S	2842	Hole A: RCB core to 222 mbsf; Log with triple combo & FMS-sonic	4.0	0.8
EPSP approval	4.907800° E		(sediment thickness: 122 m, basement penetration: 100 m)		
to 485 mbsf					
			Subtotal days on site: 4.8		

Table T2 (continued). (Continued on next page.)

Proposed site	Location (latitude, longitude)	Seafloor depth (mbrf)	Description of operations	Coring, drilling (days)	Logging (days)
VB-2B	23.281200° S	2829	Hole A: RCB core to 226 mbsf; Log with triple combo & FMS-sonic	3.5	0.8
EPSP approval	5.057300° E		(sediment thickness: 126 m, basement penetration: 100 m)		
to 812 mbsf					
			Subtotal days on site: 4.3		
VB-3B	24.602700° S	4061	Hole A: RCB core to 293 mbsf; Log with triple combo & FMS-sonic	4.5	1.0
EPSP approval	4.667600° E		(sediment thickness: 193 m, basement penetration: 100 m)		
to 543 mbsf					
			Subtotal days on site: 5.5		
VB-4B	24.584800° S	3970	Hole A: RCB core to 399 mbsf; Log with triple combo & FMS-sonic	5.9	1
EPSP approval	4.660900° E		(sediment thickness: 299 m, basement penetration: 100 m)		
to 631 mbsf					
			Subtotal days on site: 6.9		
VB-5A	23.371900° S	2820	Hole A: RCB core to 265 mbsf; Log with triple combo & FMS-sonic	3.7	0.9
EPSP approval	4.957900° E		(sediment thickness: 165 m, basement penetration: 100 m)		
to 515 mbsf					
			Subtotal days on site: 4.6		
VB-6A	23.176700° S	2621	Hole A: RCB core to 552 mbsf; Log with triple combo & FMS-sonic	5.4	1.1
EPSP approval	5.170300° E		(sediment thickness: 452 m, basement penetration: 100 m)		
to 813 mbsf					
			Subtotal days on site: 6.5		
VB-7A	26.295785° S	1898	Hole A: RCB core to 408 mbsf; Log with triple combo & FMS-sonic	3.9	0.9
EPSP approval	4.973920° E		(sediment thickness: 308 m, basement penetration: 100 m)		
to 650 mbsf					
			Subtotal days on site: 4.8		
VB-8A	26.269156° S	2077	Hole A: RCB core to 371 mbsf; Log with triple combo & FMS-sonic	3.9	0.9
EPSP approval	4.958304° E		(sediment thickness: 271 m, basement penetration: 100 m)		
to 650 mbsf					
			Subtotal days on site: 4.8		
VB-9A	26.194484° S	2154	Hole A: RCB core to 384 mbsf; Log with triple combo & FMS-sonic	4.0	0.9
EPSP approval	5.108462° E		(sediment thickness: 284 m, basement penetration: 100 m)		
to 650 mbsf					
			Subtotal days on site: 4.9		
VB-10A	26.007816° S	2897	Hole A: RCB core to 502 mbsf; Log with triple combo & FMS-sonic	5.2	1.1
EPSP approval	4.812774° E		(sediment thickness: 402 m, basement penetration: 100 m)		
to 750 mbsf					
			Subtotal days on site: 6.3		
VB-11A	26.125066° S	2618	Hole A: RCB core to 280 mbsf; Log with triple combo & FMS-sonic	3.8	0.9
EPSP approval	4.998272° E		(sediment thickness: 180 m, basement penetration: 100 m)		
to 550 mbsf					
			Subtotal days on site: 4.7		

Table T2 (continued).

Proposed site	Location (latitude, longitude)	Seafloor depth (mbrf)	Description of operations	Coring, drilling (days)	Logging (days)
VB-13A	25.202772° S	3954	Hole A: RCB core to 233 mbsf; Log with triple combo & FMS-sonic	4.1	0.8
EPSP approval	7.496033° E		(sediment thickness: 133 m, basement penetration: 100 m)		
to 500 mbsf					
			Subtotal days on site: 4.9		
VB-15A	23.827388° S	2006	Hole A: RCB core to 447 mbsf; Log with triple combo & FMS-sonic	4.3	1.0
EPSP approval	5.570439° E		(sediment thickness: 347 m, basement penetration: 100 m)		
to 700 mbsf					
			Subtotal days on site: 5.3		